AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (original) A digital automatic white balance device comprising:

a timing controller for receiving a vertical synchronization signal and a horizontal synchronization signal of an input image inputted to the device, and producing a timing control signal;

an RGB multiplier for multiplying input RGB image data inputted to the device by received RGB gains corresponding respectively to RGB channels;

a first YCbCr averaging unit for converting input RGB image data inputted to the device to YCbCr image data, and then obtaining first YCbCr averages Y1avg, Cb1avg and Cr1avg of this YCbCr image data;

a second YCbCr averaging unit for converting output RGB image data outputted from the RGB multiplier to YCbCr image data, and then obtaining second YCbCr averages Y2avg, Cb2avg and Cr2avg of this YCbCr image data; and

an RGB gain controller for comparing the second YCbCr averages with predetermined target YCbCr averages, respectively, according to the timing control signal from the timing controller, and obtaining RGB gains, corresponding respectively to the channels, on the basis of the first YCbCr averages, according to the compared result, and then providing the obtained RGB gains to the RGB multiplier.

2. (original) The device according to claim 1, wherein the first YCbCr averaging unit includes:

a first RGB-to-YCbCr converter for converting the input RGB image data to YCbCr image data;

and a first YCbCr averager for obtaining first YCbCr averages of the YCbCr image data from the first RGB-to-YCbCr converter.

3. (original) The device according to claim 1, wherein the second YCbCr averaging unit includes:

a second RGB-to-YCbCr converter for converting the output RGB image data to YCbCr image data; and

a second YCbCr averager for obtaining second YCbCr averages of the YCbCr image data from the second RGB-to-YCbCr converter.

4. (original) The device according to claim 1, wherein different operations of the RGB gain controller are selected depending on whether "RGB gain enable or disable" is set, so that if the RGB gain enable is set, the RGB gain controller recalculates and provides RGB gains, and if the RGB gain disable is set, the RGB gain controller provides predetermined basic RGB gains.

5. (original) The device according to claim 1, wherein the RGB gain controller has preset coarse, fine and lock ranges, and if the second YCbCr averages are within the coarse or fine ranges, the RGB gain controller recalculates RGB gains corresponding respectively to the channels, and provides them to the RGB multiplier, and on the other hand, if the second YCbCr averages are within the lock range, the RGB gain controller provides previous RGB gains, corresponding respectively to the channels, to the RGB multiplier.

6. (original) The device according to claim 5, wherein if the second YCbCr averages are within the coarse range, the RGB gain controller changes Y/Cb/Cr steps on the basis of a predetermined coarse step, and then calculates the RGB gains, corresponding respectively to

the channels, on the basis of the changed Y/Cb/Cr steps, the first YCbCr averages, and the target YCbCr averages.

7. (original) The device according to claim 6, wherein the RGB gain controller compares the second YCbCr averages with the target YCbCr averages, and changes the Y/Cb/Cr steps by adding or subtracting the coarse step to or from the Y/Cb/Cr steps on the basis of the compared result, and then calculates the RGB gains, corresponding respectively to the channels, on the basis of the changed Y/Cb/Cr steps, the first YCbCr averages, and the target YCbCr averages.

8. (original) The device according to claim 7, wherein the RGB gain controller calculates the RGB gains on the basis of a predetermined A/D conversion resolution $(2^N - 1)$, the changed Y/Cb/Cr steps, the first YCbCr averages, and the target YCbCr averages.

9. (original) The device according to claim 5, wherein if the second YCbCr averages are within the fine range, the RGB gain controller changes the Y/Cb/Cr steps on the basis of a predetermined fine step, and then calculates the RGB gains, corresponding respectively to the channels, on the basis of the changed Y/Cb/Cr steps, the first YCbCr averages, and the target YCbCr averages.

10. (original) The device according to claim 9, wherein the RGB gain controller compares the second YCbCr averages with the target YCbCr averages, and changes the Y/Cb/Cr steps by adding or subtracting the fine step to or from the Y/Cb/Cr steps on the basis of the compared result, and then calculates the RGB gains, corresponding respectively to the channels, on the basis of the changed Y/Cb/Cr steps, the first YCbCr averages, and the target YCbCr averages.

11. (original) The device according to claim 10, wherein the RGB gain controller calculates the RGB gains on the basis of a predetermined A/D conversion resolution $(2^N - 1)$, the

changed Y/Cb/Cr steps, the first YCbCr averages, and the target YCbCr averages.

12. **(new)** A digital automatic white balance device, comprising:

a timing controller for receiving a vertical synchronization signal and a horizontal synchronization signal of an image signal inputted to the device, and producing a timing control signal;

an RGB multiplier for multiplying input RGB image data by controllable RGB gains to obtain output RGB image data, the RGB multiplier having

image data inputs for receiving the input RGB image data,

image data outputs for outputting the output RGB image data, and

RGB gain inputs for receiving the RGB gains;

a first YCbCr averaging unit for converting the input RGB image data to input YCbCr image data, and for obtaining first YCbCr averages Y1avg, Cb1avg and Cr1avg of the input YCbCr image data, the first YCbCr averaging unit having

first inputs coupled to the image data inputs of the RGB multiplier for receiving the input RGB image data, and

first outputs for outputting the first YCbCr averages;

a second YCbCr averaging unit for converting the output RGB image data to output YCbCr image data, and for obtaining second YCbCr averages Y2avg, Cb2avg and Cr2avg of the output YCbCr image data, the second YCbCr averaging unit having

second inputs coupled to the image data outputs of the RGB multiplier for receiving the output RGB image data, and

second outputs for outputting the second YCbCr averages; and

an RGB gain controller for

comparing the second YCbCr averages with predetermined target YCbCr averages, respectively, according to the timing control signal,

controlling the RGB gains on the basis of the first YCbCr averages,

according to the comparison result, and

providing the controlled RGB gains to the RGB multiplier;

wherein the RGB gain controller has

third inputs coupled to the first and second outputs of the first and second YCbCr averaging units for receiving the first and second YCbCr averages, and

third outputs coupled to the RGB gain inputs for outputting the controlled RGB gains to the RGB multiplier.

13. **(new)** The device according to claim 12, wherein the RGB gain controller has preset coarse, fine and lock ranges, and

if the second YCbCr averages are within the coarse or fine ranges, the RGB gain controller is adapted to recalculate the RGB gains based on the first YCbCr averages, and to provide the recalculated RGB gains to the RGB multiplier, and

if the second YCbCr averages are within the lock range, the RGB gain controller is adapted to maintain current RGB gains, and to provide the current RGB gains to the RGB multiplier.

14. **(new)** The device according to claim 13, wherein the RGB gain controller comprises two coarse ranges, two fine ranges located between the coarse ranges, and a single lock range located between the fine ranges.

15. **(new)** The device according to claim 14, wherein the RGB gain controller is adapted to recalculate the RGB gains based on

the first YCbCr averages,

the target YCbCr averages, and

predetermined coarse or fine YCbCr steps depending on whether the second YCbCr averages are within the coarse or fine ranges, respectively.

16. **(new)** The device according to claim 15, wherein the RGB gain controller is adapted to

compare the second YCbCr averages with the target YCbCr averages,

change current YCbCr steps by adding or subtracting the predetermined coarse or fine YCbCr steps to or from the current YCbCr steps on the basis of the comparison result, and

recalculate the RGB gains on the basis of the changed YCbCr steps, the first YCbCr averages, and the target YCbCr averages.

17. **(new)** The device according to claim 16, wherein the RGB gain controller is adapted to recalculate the RGB gains on the basis of a predetermined A/D conversion resolution $(2^N - 1)$, the changed Y/Cb/Cr steps, the first YCbCr averages, and the target YCbCr averages.

18. **(new)** The device according to claim 14, wherein the RGB gain controller is adapted to recalculate the RGB gains during a vertical blank time between consecutive image frames in the image signal.

19. **(new)** The device according to claim 14, wherein the first YCbCr averaging unit is adapted to

continuously read and accumulate the input RGB image data until all input RGB image data of each image frame in the image signal has been read, and

obtain the first YCbCr averages as averages of all the read input RGB image data of said image frame.

20. **(new)** The device according to claim 14, wherein the second YCbCr averaging unit is adapted to

continuously read and accumulate the output RGB image data until all output RGB image data of each image frame in the image signal has been read, and

obtain the second YCbCr averages as averages of all the read output RGB image data of said image frame.